

CAMEX3 Polarimetric Scanning Radiometer Matlab Mapping Software Description

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Marian Klein

A.J. Gasiewski

NOAA Environmental Technology Laboratory

Boulder, CO 80303

mklein@etl.noaa.gov

agasiewski@etl.noaa.gov

The directory **“display_23a”** contains the Matlab version 5.3 m-files necessary to render brightness temperature maps from the PSR CAMEX3 level 2.3a data. The calibrated 2.3a data are assumed to be organized in a series of subdirectories (one for each CAMEX3 flight) in the following manner:

experiment_directory/yyyy_mmdd\level2.3a\sl\L23axxxx

where:

“experiment_directory” is the root name of the main directory (e.g. CAMEX3),

“yyyy_mmdd” is a flight code subdirectory indicating the year, month, and day of the beginning of data flight (UTC),

“level2.3a” is a subdirectory referring to the data level,

“sl” is a subdirectory referring to straight and level maneuvers, and

“L23axxxx.mat” is a data file of type **“mat”** corresponding to a maneuver with serial number XXXX.

Information about all individual maneuvers can be found in the file **“camex3_data_flight_catalog.doc”**. The Matlab data and m-files should be downloaded by the user and organized in the fashion described above. The file **“CAMEX3L23a.log”** should also be located in **“experiment_directory”**. After downloading, two minor additional changes need to be made to allow the user to run the display m-files using Matlab. These are:

- 1) the m-file named **“setrootdir.m”** needs to be edited, with the variable **“rootdir”** needs to be changed to indicate the path to the directory **“experiment_directory”**, and
- 2) the Matlab path needs to be modified to include the subdirectory of mfiles in **“display_23a”**.

To operate the m-files, type the command **“mapl23a”** in the Matlab command window. The program will show the available dates for display, and the user is prompted to select a particular flight code. The program then lists all available maneuvers from the selected flight code by their serial numbers and queries the user to select which file(s) is(are) to be displayed. The user can select the maneuver(s) by either the listed ordinal number or the associated CAMEX3 maneuver serial number, for example, **“sxxxx”**. A group of maneuvers can be selected by indicating the range of ordinal numbers, for example, **“2:13”**. If more than one maneuver is selected, the program will ask if user wants to spatially interpolate between adjacent maneuvers (e.g., using kriging) or overlay them on top of each other. If interpolation is selected, the program will automatically interpolate between the end of one maneuver and beginning of the next. When the default option (overlay) is selected, no interpolation is performed and the data are overlaid, possibly overwriting data from previous maneuvers.

After loading data for selected maneuvers, the program queries the user for the channel (or set of channels) to be displayed. Several channel grouping options are provided in the command line. The next variables that can be selected are the minimum and maximum brightness temperatures for the range of the color map. If the minimum color temperature is defined by user, he/she will also be asked for the maximum, otherwise the program will automatically assign those values. If auto-range calculation is selected the program will attempt to fit a Gaussian probability distribution function to the brightness temperature histogram, and compute the color range individually for each channel using the Gaussian parameters along with a range factor. The range factor sets the color range relative to the mean by the indicated number of standard deviations. The range factor defaults to 0.6, but can be modified according to the needs of the user. Autocalculation is useful for scenes wherein the brightness temperatures mostly fall within a narrow range of values.

Proceeding, the user is able to display only a portion of the maneuver by selecting the scans to be displayed from all the scans available in the selected set of maneuvers. Here, for conical scanning, one full scan means one full rotation around azimuth axis, and includes front and back looks. Next, the user can choose to produce either individual maps (i.e., one image for each channel) or composite image of all channels and looks in a single map. Finally, the user has the option of selecting new latitude and longitude corners. If the user has installed the Matlab Mapping Toolbox, he/she will also be asked to choose whether to include lines of individual U.S. states on the final map.

It is noted that the CAMEX3 **.jpg** image files on the PSR web page have been rendered using the **mapl23a** program.